ELDORADO NATIONAL FOREST
AMADOR RANGER DISTRICT
BIOLOGICAL ASSESSMENT / EVALUATION FOR BOTANICAL SPECIES:

DEER VALLEY 4WD MEADOW RESTORATION AND BLUE LAKES ROAD MAINTENANCE PROJECT
2015

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Table of Contents

I. INTRODUCTION

Purpose: Forest Service Manual 2672.42 specifies that a biological evaluation (BE) and a biological assessment (BA) be prepared to determine if a project may affect any USDA Forest Service (FS) sensitive species and US Fish and Wildlife Service (USFWS) threatened, endangered, or proposed species and their designated or proposed critical habitat. This BE/BA is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (16 U.S.C. 1536 (c)). The purpose of this BE/BA is to review the Deer Valley 4wd Trail Meadow Restoration and Blue Lakes Road Maintenance Project in sufficient detail to determine to what extent the proposed action may affect any threatened, endangered, proposed, and sensitive (TES) plant species for the project area.

The Amador Ranger District of the Eldorado National Forest proposes trail maintenance and meadow restoration on the Deer Valley 4wd trail and road maintenance on the Blue Lakes/Meadow Lakes road.

Location: Portion of Deer Valley Trail (19E01) and Meadow Lake Road (9N01) currently closed to public wheeled motorized vehicles on the Eldorado National Forest (Alpine County).

Species:

Listed

A species list was obtained from the USFWS to identify threatened, endangered, or proposed listed species that could occur, or be affected by projects on the Eldorado National Forest from the USDI Fish and Wildlife Service pursuant to Section 7 (c) of the Endangered Species Act (current as of August 6, 2015).

Currently the only TEP plant species expected to occur on the Eldorado NF is *Packera layneae*. Potential habitat for *Packera layneae* is not found within the proposed project area.

Sensitive

There are a no known sensitive plants within the project area. Potential habitat for the following Sensitive plant species was identified during field surveys of the project area in 2014.

1) *Botrychium spp*
2) *Pinus albicaulis*

Table 1 lists all Sensitive plant taxa from the ENF. No other Threatened, Endangered, Proposed, or Sensitive (TEPS) plant taxa have known occurrences or potential habitat on the ENF. Taxa that do not have potential habitat in the project area are not further analyzed in this document. Botanical surveys conducted for the proposed project focused on species with potential habitat. Botanists searched for these habitats (e.g., meadow) as well as for the Sensitive taxa.

Table 1. Habitat potential of the Proposed Deer Valley and Meadow Lake Road project (7,500 ft) for the TEPS plant taxa known or suspected to occur on the Eldorado National Forest.

Species	Status[1]	On ENF[2]	Known in Project Area	Suitable Habitat in Project Area	Rationale For Determination Of No Suitable Habitat/No Effect
Three-bracted onion (Allium tribracteatum)	S	P	No	No	Grows on open ridges with gravelly lahar soils (lava cap communities) in chaparral and lower & upper montane coniferous forests from ~ 3,300 to 10,000 feet in elevation.
El Dorado manzanita (Arctostaphylos nissenana)	S	K	No	No	Grows on highly acidic slate and shale soils and is often associated with closed-cone conifer forest from about 1,400 to 3,600 feet.
Big-scale balsamroot (Balsamorhiza macrolepis var. macrolepis)	S	P	No	No	Grows in chaparral, vernally moist meadows & grasslands, grasslands within oak woodland, and ponderosa pine forest below 4,600 feet.
Upswept moonwort (Botrychium ascendens)	S	P	No	Yes	Grows in lower montane coniferous forest, meadows, and seeps from 4,900 to over 7,500 feet in elevation.
Scalloped moonwort (Botrychium crenulatum)	S	K	No	Yes	Grows in fens, lower montane coniferous forest, meadows, seeps, and freshwater marshes from 4,900 feet to 10,500 feet in elevation.
Common moonwort (Botrychium lunaria)	S	P	No	Yes	Grows in meadows, seeps, subalpine and upper montane coniferous forest from 7,450 feet to over 11,000 feet in elevation.
Mingan moonwort (Botrychium minganense)	S	K	No	Yes	Grows in fens, lower and upper montane coniferous forest, meadows, and seeps from 4,900 to 6,750 feet.
Mountain moonwort (Botrychium montanum)	S	K	No	Yes	Grows in lower and upper montane coniferous forest, meadows, and seeps from 4,900 feet to 7,000 feet in elevation.
Paradox moonwort (Botrychium paradoxum)	S	K	No	No	Grows in lower and upper montane coniferous forest, meadows, and seeps from 4,900 feet to 7,000 feet in elevation.
Stalked moonwort (Botrychium pendunculosum)	S	P	No	No	Grows in lower and upper montane coniferous forest, meadows, and seeps from 4,900 feet to 7,000 feet in elevation.
Bolander's bruchia (Bruchia bolanderi)	S	K	No	No	Grows in meadows and fens in montane and subalpine communities from about 5,500 to 9,000 feet. Grows in ephemeral habitats such as erosional ditches or small streamlets through wet meadows.

Pleasant Valley mariposa lily (Calochortus clavatus var. avius)	S	K	No	No	Grows in openings in mixed conifer & ponderosa pine forest, usually on ridgetops and south-facing slopes from 2,500 to 5,600 feet.
Mountain lady's slipper (Cypripedium montanum)	S	P (K on inholding)	No	No	Grows in moist areas and upland sites with northerly aspects, loamy soils and shade, from 3,500 to 5,700 feet (generally <5,000 ft).
Tahoe draba (Draba asterophora var. asterophora)	S	H	No	No	Restricted to rocky ledges and talus slopes in subalpine and alpine habitats above 8,200 feet.
Cup Lake draba (Draba asterophora var. macrocarpa)	S	K	No	No	Restricted to sandy slopes, rocky ledges, and talus slopes in subalpine and alpine habitats above 8,200 ft.
Tripod buckwheat (Eriogonum tripodum)	S	K	No	No	Grows on serpentine soils in foothill and cismontane woodlands below 5,300 feet.
Blandow's bog-moss (Helodium blandowii)	S	P	No	No	Grows in wet meadows, fens, & seeps in subalpine coniferous forest and alpine lakes from 6,100 to 9,000 feet.
Parry's horkelia (Horkelia parryi)	S	K	No	No	Grows on stony, disturbed, slightly acidic soils in open chaparral and cismontane woodland below 3,400 feet.
Hutchison's lewisia (Lewisia kelloggii ssp. hutchisonii)	S	K	No	No	Grows in openings in upper montane coniferous forest, often on slate soils and on soils that are sandy granitic to erosive volcanic from 4,800 to 7,000 feet.
Kellogg's lewisia (Lewisia kelloggii ssp. kelloggii)	S	K	No	No	Grows on granitic and volcanic balds from about 5,000 to 8,000 feet.
Long-petaled lewisia (Lewisia longipetala)	S	K	No	No	Restricted to subalpine & alpine slopes or basins with deep snow accumulations, above 8,200 feet.
Saw-toothed lewisia (Lewisia serrata)	S	K	No	No	Restricted to steep, nearly vertical cliffs in inner gorges of perennial streams and rarely near seeps and intermittent streams. Grows between 2,800 and 4,800 feet in the American River watershed.
Broad-nerved hump-moss (Meesia uliginosa)	S	P	No	No	Grows in permanently wet, primarily spring-fed meadows and fens in montane to subalpine coniferous forest from 4,200 to 9,200 feet.
Yellow bur navarretia (Navarretia prolifera ssp. lutea)	S	K	No	No	Grows in openings in or adjacent to mixed conifer forest or cismontane woodland on rocky ridgelines, saddles, or eroding ephemeral drainages from 2,300 to 5,000 feet.

Adder's tongue (Ophioglossum pusillum)	S	P	No	No	Grows in moist habitat including wet meadows and roadside ditches <6,500 feet.
Layne's ragwort (Packera layneae)	T, S	K	No	No	Grows on rocky, gabbroic or serpentinitic soils in chaparral and cismontane woodland below 3,000 feet.
Veined water lichen (Peltigera hydrothyria)	K	K	No	No	Grows on rocks in cold, unpolluted spring-fed streams without marked seasonal fluctuation. Submerged most of year. Peak flows must not scour the rocks & gravels where this species attaches. Located on the ENF in 2008.
Stebbins' phacelia (Phacelia stebbinsii)	S	K	No	No	Grows on dry, open, rocky sites (bedrock outcrops, rubble or talus) on ledges or moderate to steep slopes and on damp, mossy inner gorges from 2,000 to 6,800 feet.
Sierra blue grass (Poa sierrae)	S	K	No	No	Grows in lower montane coniferous forest on steep, shady, moist slopes from 1,200 feet to 3,800 feet.
Whitebark pine (Pinus albicaulis)	C, S	K	No	Yes	Whitebark pine typically occurs on cold and windy high elevation sites in western north America (7,000-12,000 feet).

[1] S = Forest Service Sensitive; T =Federally Listed as Threatened; C= Candidate Species

[2] H = historic record; K = known to occur on ENF; P = suspected to occur on ENF

Field reconnaissance: The project area was surveyed for Sensitive plants and invasive plants in 2014. Surveys were intuitive targeting potential habitat in the project area. No new sensitive plant occurrences were found in the proposed project footprint or reroutes. Marginal habitat for sensitive species was identified along 09N01 and 09N83-2 (Deer Valley Meadow).

II. CONSULTATION TO DATE

No formal or informal consultation with the USFWS has been conducted since T&E species or potential habitat does not exist in or near the project area.

III. CURRENT MANAGEMENT DIRECTION

The goal of the Forest Sensitive Plant Program is to maintain viable populations of sensitive plant species, and under Management Practice 49, the General Direction is to "provide for protection and habitat needs of sensitive plants so that Forest activities would not jeopardize the continued existence of such species" (Land and Resource Management Plan, 1989).

"A [viable] population…has the estimated numbers and distribution of reproductive individuals to ensure the continued existence of the species throughout its existing range within the planning area" (FSM 2670.5)

Current policy as stated in the Forest Service Manual (FSM 2670.32) includes the following:
Assist States in achieving their goals for conservation of endemic species.

1. As part of the National Environmental Policy Act process, review programs and activities.
2. Avoid or minimize impacts to species whose viability has been identified as a concern.
3. If impacts cannot be avoided, analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole. (The line officer, with project approval authority, makes the decision to allow or disallow impact, but the decision must not result in loss of species viability or create significant trends toward Federal listing.)
4. Establish management objectives in cooperation with the States when projects on National Forest System lands may have a significant effect on Sensitive species population numbers or distributions. Establish objectives for Federal candidate species, in cooperation with the FWS and the States.

The current condition of Sensitive plant species on the Eldorado National Forest reflects the effects of past and present management activities. Presently there is not enough evidence to suggest whether Sensitive plant populations and/or ranges are increasing, decreasing, or stable. Monitoring of occurrences, which detects decreases or increases from year to year, may merely reflect normal variation in individual numbers as a response to annual climatic changes. There is also considerable uncertainty regarding future changes in local climatic patterns. Given the lack of data needed to take a proactive management approach to these Sensitive plant species, the best available interim management approach is to minimize impacts to known occurrences of Sensitive plant species while allowing expansion into suitable unoccupied habitat. This strategy would also maximize the diversity of habitat and microsite conditions (slope, aspect, elevation, etc) for Sensitive plants on the Eldorado National Forest which may be important in face of future climate change. While much is unknown about the potential long-term effects of a warming and/or drying climate on Sensitve plant species, in the near term, maintaining habitat diversity across the species range may be the best means to manage for species which could require unique microsites to persist under future climatic conditions.

IV. PROJECT DESCRIPTION

Deer Valley 4wd trail: The proposed action would include corrective actions to reduce resource impacts associated with the Deer Valley Trail at meadows 9N83-2 and 9N83-1 and to limit potential impacts to Yosemite toad from public motor vehicle travel after the trail is reopened. Proposed action items include:

1) **MVUM**: Add Deer Valley 4wd trail (19E01) back to the MVUM. Adding the Deer Valley 4wd trail to MVUM is not contingent on the completion of the proposed corrective actions at Meadows 9N83-2 and 9N83-1 since evaluation has found the route to be consistent with Forest Plan Standard and Guideline 100.

2) **Forest Order**: A seasonal closure from January 1st to July 31st would be instituted for the portion of Deer Valley 4wd trail currently closed under the Travel Management SEIS to limit impacts to Yosemite toads from public wheeled motor vehicle use. Closure signs and maps would be places at both trailheads, Clover Valley, and the southern portion of the trail 0.25 north of the Eldorado and Stanislaus National Forest boundary alerting the public of the seasonal closure.

3) **Trail Reroute**: A short reroute (< 500 feet) of 19E01 on the west side of Deer Creek would be completed in order to move the trail away from areas of active stream bank erosion while improving the angle of approach to the existing stream crossing. The new trail segment would be located approximately 100 feet west of the existing trail and would require the removal of approximately 20 trees (5 trees >20 inch DBH) and stumps to clear a new trail corridor. Material generated from construction of the reroute (wood chips and logs) would be used to block dispersed areas, define a new trail, and apply mulch to the old trail corridor. The old roadbed would be planted with locally collected vegetation.

4) **Hardening crossing at Meadow 9N83-2**: Native rock and boulders from the trail or the Clover Valley sediment field would be imported to harden the approaches to Deer Creek using large cobbles and rock between 8-16" diameter. The stream crossing would also be delineated with boulders to limit the width of the crossing at both sides of Deer Creek.

5) **Stream Bank Restoration**: The proposed project would restore stream banks in Deer Valley (9N83-2) and Clover Valley (9N83-1) meadow impacted by past off-trail vehicle travel using revegetation methods such as seeding, willow cuttings, and transplanting sod plugs.

Blue Lakes/Meadow Lake road: The proposed action for Blue Lakes/Meadow Lake Road consists of road maintenance activities to bring the road into compliance with S&G 100 while also limiting potential impacts to Yosemite toad from vehicle travel. Specific proposed action items include:

1) **MVUM**: Add Blue Lakes/Meadow Lake road (9N01) back to the MVUM after corrective actions have occurred to restore hydrologic connectivity.

2) **Forest Order**: A seasonal closure from January 1st to July 31 would be instituted for the portion of Blue Lakes/Meadow Lake road currently closed under the travel management SEIS to limit impacts to Yosemite toad from public wheeled motor vehicle use. Seasonal closure signs would be placed west of Twin Lake closing approximately the last mile of the route to public motor vehicles.

3) **Road Maintenance:** Typical maintenance activities would include: maintaining/installing BMP's(Catch basins at culverts, new culverts where needed and gravel on the steep sections of the roadway, repairing rolling dips), linear grading, and clearing out/ upgrading undersized culverts within the specified alignment and grade tolerances. Ground disturbance will kept within approximately 25ft of road centerline. Blue Lakes/Meadow Lake road (9N01) will be added to the MVUM once necessary corrective measures have been completed.

<u>Design Features</u>

- The use of ground-based mechanized/motorized vehicles or equipment to implement the restoration activities would not occur during the proposed seasonal

closures for routes 09E01 and 09N01 to limit impacts to Yosemite toad and Sierra Nevada Yellow Legged Frog.

- Restoration activities associated with Deer Creek and the unnamed perennial stream between Meadow Lake and Twin Lake would be completed during a period of low streamflow. This typically occurs in late summer and early fall. The project Hydrologist will be consulted before implementation of work to the Meadow Lakes Road (09N01) and the Deer Valley Trail to insure that streamflow is low enough for road maintenance and restoration activities to occur.

- Restoration activities associated with Deer Valley 4wd Trail (09E01) and Meadow Lake Road (9N01) would be monitored for efficacy as outlined in the Eldorado National Forest Travel Management SEIS Settlement Agreement Monitoring plan (2015).

- All equipment would avoid traveling off the hardened road surface (i.e. outside of the route footprint) or crossing into aquatic habitat *to the extent possible* during restoration activities associated with the hardening of the approaches at route 09E01's stream crossing at Deer Creek (in meadow 9N83-2) and the culvert installation, repair, and maintenance on Route 09N01. Aquatic habitat includes the portion of route 09E01 that crosses directly through Deer Creek.

- Where equipment travels off the hardened road surface for restoration work, such as the reroute, these areas shall be surveyed for existing Yosemite toads just prior to starting work to avoid crushing. Yosemite toads and Sierra Nevada yellow-legged frogs by qualified FS personnel just prior to starting work to avoid crushing. If either SNYLF or YOTO are found within the area, their safety shall be assessed by qualified personnel and dealt with according to the Terms and Conditions described in USDI FWS 2014. Since Yosemite toads have been found to have site fidelity to burrows, extra attention will be given to identify existing burrows during the survey. Burrows will be avoided where possible.

- Fuels and other toxic materials will be stored outside of riparian conservation areas (per S&G 99) to limit the exposure of the listed species to the toxic materials.

- The use of low velocity water pumps and screening devices for pumps (per S&G 110) will be utilized during drafting for project treatments to preventing mortality of eggs, tadpoles, juveniles, and adult SNYLF and YOTO. A drafting box measuring 2 feet on all sides covered in a maximum of 0.25 inch screening is required.

- Should any TES species or watch list plant species be located associated with this project location district biology staff would be informed, and steps taken to evaluate, and mitigate any possible effects not covered by this assessment.

- A limited operating period (LOP) for northern goshawks (February 15 through September 15) would restrict restoration activities along a portion of the Deer Valley 4wd Trail that is located within ¼ mile of the goshawk nests, unless surveys confirm that goshawks are not nesting. The timing of the LOP would coincide with the hydrology design criteria for restoration activities taking place during a period of low stream flow.

- All off-road equipment would be cleaned to insure it is free of soil, seeds, vegetative matter or other debris that could contain seeds before entering the project area.

- Any straw or mulch used for erosion control would be certified weed-free. A certificate from the county of origin stating the material was inspected is required.

- Any revegetation material used for restoration or erosion control would be from a locally collected source.

- Infestations of noxious weeds that are discovered during project implementation would be documented and locations mapped. New sites would be reported to the Forest botanist.

- All gravel, fill, rock or other material would be weed free. Onsite sand, gravel, or rock would be used where possible.

- Known cultural resource sites will be flagged prior to work and avoided during implementation. There is to be no vehicle travel, vehicle or material staging, rock collection, or tree felling within the flagged areas.

- Should any previously unrecorded cultural resources be encountered during implementation of this project, all work should immediately cease in that area and the District Archaeologist be notified immediately. Work may resume after approval by the District Archaeologist; provided any recommended Standard Protection Measures are implemented.

Alternative 2 No Action Alternative

Under this alternative, no work would be done on Meadow Lake Road and Deer Valley Trail, and the routes would not be reopened to public wheeled motor vehicle use.

Alternative 3 Modify Seasonal Closure
Alternative 3 would be similar to the proposed action except for the following: Alternative 3 would use a seasonal closure determined by snowmelt measured at Blue Lakes for the portion of the Deer Valley 4WD Trail and Meadow Lake Road currently closed under the Eldorado National Forest Travel Management SEIS. Under Alternative 3, the LOP would exclude motorized use of the Deer Valley 4WD Trail and Meadow Lake Road for 6 weeks after documented snowmelt (i.e. snow water content < or = 1.0 inch) as reported from the Blue Lake Snow Sensor Station. Six weeks would significantly reduce the risk of disturbance, injury, or mortality of adult Yosemite Toads while still providing recreation opportunities along the trail. In addition to posting closure signs and maps on Deer Valley and Meadow Lake Road, the Forest would post the status of the trail on the Eldorado National Forest website and the Amador District Office. In the event that the Blue Lakes snow sensor is not functioning, FS staff would attempt to verify snow condition at Blue Lakes and/or within the suitable habitat in the vicinity of the Deer Valley trail and Meadow Lake road during the spring snowmelt to determine when the seasonal closure would be lifted from the trail. Based on past data from the Blue Lakes Snow Sensor Station (2005-2014), Deer Valley trail and Meadow Lake road would have opened between June 24 and August 20 under Alternative 3. Alternative 3 would also include installation of a gate west of Twin Lake on Meadow Lake Road.

Alternative 4 Extended Seasonal Closure
Alternative 4 would be similar to the proposed action except for the following: This Alternative would implement a seasonal closure from January 1 to August 15 along the portion of Deer Valley 4wd trail and Meadow Lake Road currently closed under the Travel Management SEIS. This Alternative was added based on scoping comments that the seasonal closure needed to extend beyond July 31st to adequately protect Yosemite Toad along Deer Valley trail and Meadow Lake Road. This alternative would also include a gate along Meadow Lake Road to limit vehicle travel on the road during the seasonal closure.

V. EXISTING SPECIES AND HABITAT CONDITION

Sensitive Plant Species

Meadow 09N83-1: Clover Valley is a large 33.6 acre dry meadow. Common species within the meadow include *Deschampsia cespitosa, Muhlenbergia filiformis*, and *Hordeum brachyantherum*. Along the stream banks of Blue Creek are scattered patches of *Salix lemmonii*. There is no potential habitat for Sensitive plant species within the meadow, especially within areas of proposed restoration work.

Meadow 09N83-2: Deer Valley Meadow is a narrow 5.8 acre moderately wet meadow along Blue Creek. The stream banks contain scattered thickets of willow (*Salix lemmonii*) and Alder (*Alnus tenuifolia*). Majority of meadow is dominated by *Hordeum brachyantherum* and *Glyceria elata*. Deer Valley 4wd trail crosses through the meadow and a number of dispersed camping areas have developed in and around the meadow. The meadow contains marginal habitat for sensitive plant species found in meadow plant communities on the Eldorado NF. No new sensitive plant species were found in the meadow during site visit (8/14/2014).

09N01-All: The last 2 miles of Meadow Lake road bisects a wet meadow complex intermixed with upland stands of red fir (*Abies magnifica*), Western White pine (*Pinus monticola*), and

hemlock (*Tsuga heterophylla*). Wet areas along the road provide some marginal potential habitat for TES species associated with wet meadow. No Sensitive plant species were located during project surveys in 2014.

Listed Species

Layne's ragwort (*Packera layneae*)

Layne's butterweed is a perennial herb in the sunflower family (CNPS, 2001; USFWS, 2002) found in foothill woodland and chaparral habitats along the west slope of the Sierra Nevada in El Dorado and Tuolumne Counties at elevations between 60 and 3,000 feet. About 36 occurrences of this plant are documented on the Eldorado National Forest. Of the 32 documented occurrences in El Dorado County, two are located wholly on the ENF, one is located partially on the ENF, and one is located on a state-owned ecological preserve, and the remainder are found on private lands primarily in the Cameron Park area. *There is no potential habitat for this listed species within the proposed analysis area.*

Sensitive species

Moonworts (*Botrychium* spp.)

Botrychium species are widely distributed in North America and elsewhere. In California they occur infrequently in a variety of moist habitats throughout the Sierra Nevada and other portions of the state. Most moonwort species show a marked affinity for neutral substrates with high mineral content, especially soils developed on limestone bedrock or otherwise containing high calcium content. High elevation habitats suitably moist and cool are abundant throughout the Sierra Nevada and northern California mountains, but these mountains are mostly composed of granites, volcanics, and crustal basalts not rich in soluble calcium. However, leaf litter from incense cedar may favorably modify soils for some moonworts.

Documentation of population numbers and distribution patterns are incomplete largely because members of this genus are difficult to distinguish, and very uncommon and sporadic in distribution (Wagner and Wagner, 1993). These species appear sensitive to activities such as grazing, trampling, logging, and recreational activities such as OHV use.

Seven species of moonworts are listed as Sensitive species. They were listed as a group because 1) most species in this genus are rare in California; 2) individual species are very difficult to distinguish from each other; and 3) all have similar habitat preferences (wet or moist soils such as in meadows and fens or along the edges of lakes and streams). From the CNPS online inventory (CNPS, 2007):

1. Upswept moonwort (*Botrychium ascendens*): lower montane coniferous forest, meadows, seeps, 4,900 to over 7,500 feet
2. Scalloped moonwort (*Botrychium crenulatum*): Fens, lower montane coniferous forest, meadows, seeps, freshwater marshes, 4,900 to over 10,500 feet
3. Common moonwort (*Botrychium lunaria*): Meadows, seeps, subalpine and upper montane coniferous forest, 7,450 to over 11,000 feet
4. Mingan moonwort (*Botrychium minganense*): Fens, lower and upper montane coniferous forest, 4,900 to 6,750 feet.
5. Mountain moonwort (*Botrychium montanum*): Lower and upper montane coniferous forest, meadows, seeps, 4,900 to 7,000 feet.
6. Paradox moonwort (*Botrychium paradoxum*): Lower and upper montane coniferous forest and meadows.
7. Stalked moonwort (*Botrychium pendunculosum*): Lower and upper montane coniferous forest and meadow.

Threats to moonworts are defined as actions that alter existing site characteristics, including actions that would change the microclimate, canopy coverage, hydrology, or mycorrhizal association on a site from the regime that has supported a given population. Potential actions that could alter site condition include timber harvest, firewood cutting, fire suppression, road widening and maintenance activities, livestock grazing, invasive plant establishment, herbicide use, and recreational activity (camping and off-road vehicle driving).

Whitebark pine (*Pinus albicaulis*)
Whitebark pine is a dominant tree in many upper subalpine forest of western North America, but is limited to the subalpine and timberline zones between 7,000 and 12,000 feet. In 2011 U.S. Fish and Wildlife determined the whitebark pine warrants protection under the Endangered Species Act (ESA) and was added to the list of candidate species eligible for ESA protection and review. Potential threats to this high elevation species include mortality from white pine blister rust, mountain pine beetle, climate change, dispersed recreation and OHV activity.

Special Interest Plants and plant Communities
Refer to Appendix A, Botany report for Special Interest Species.

Noxious Weeds
See Appendix B for the Noxious Weed Risk Assessment and Appendix C for Noxious Weeds of Concern for the ENF. Implementation of included design criteria should minimize the likelihood of project activities enhancing or spreading invasive species into the proposed project area.

VI. EFFECTS

Analysis area defined: This analysis addresses activities and actions associated with the Deer Valley 4wd Trail Meadow Restoration and Meadow Lake Road Maintenance project on Eldorado National Forest. The cumulative effects for botany are bound in time by the first botany records on the Eldorado National forest (early 1980's) and covers all proposed activities that are likely to occur in the project area during the next 5 years. The spatial extent of the analysis includes all known and potential occurrences found within the area of the proposed project.

Alternative 1 (proposed action)

Direct and indirect effects for sensitive plants
Negative effects of the proposed project are not expected for TES plants since populations have not been found in the project area. Marginal potential habitat for Sensitive plant species does occur within project area. Site specific description of potential habitat and risks of impacts follows:

> Meadow 09N83-2 (Deer Valley) Limited potential habitat for Sensitive species occurs within the small meadow primarily along the stream banks and the moist areas of the meadow. The proposed restoration activities along the channel are not expected to impact potential habitat quality for Sensitive plant species. The trail reroute will move the majority of the trail outside of potential habitat for Sensitive plant species found in wet meadow communities.
>
> Meadow 09N83-1 Potential habitat for Sensitive plant species was found near Blue Creek and the moist meadow near the sediment plume but the majority of Clover Valley is too dry to support Sensitive plant species associated with wet meadow communities. None of the potential habitat for Sensitive plant species is in the vicinity of proposed meadow restoration activities and would not be affected by the project.

09N01 (Meadow Lake Road) Portions of the road bisects wet meadows and springs that could support Sensitive plant species. Since road maintenance activities will largely remain within the current road prism potential effects to any undiscovered Sensitive plant species or habitat is considered unlikely.

While survey coverage for the project of the defined project area was adequate, it is possible for recent surveys overlooked existing sensitive plants (surveys can only positively state a species presence, not its absence). If surveys inadvertently overlook sensitive plants, these individuals could be uprooted, crushed, or displaced during project activities. While a possibility, the potential for effects to undiscovered populations is relatively remote given the limited scope of the proposed road maintenance and meadow restoration activities. If new occurrences are found during project implementation the project botanist would be contacted and necessary mitigations developed to limit impacts to newly discovered sensitive plant species.

Cumulative Effects

In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects and is consistent with National Environmental Policy Act (NEPA) Regulations (36 CFR 220.4(f)) (July 24, 2008).

Adverse impacts to sensitive plants from recent (1989-2013) activities have largely been minimized by the use of mitigation measures, mainly the use project specific plant suveys and avoidance of known occurrences. Ongoing and future management activities in the project area would likely include trail maintenance, hazard tree removal, and fire suppression activities. It is anticipated that future impacts to sensitive plants would continue to be minimized through the use of avoidance for the above foreseeable actions. Avoidance or other means of mitigating impacts to sensitive plant occurrences is consistent with direction contained in in the ENF LMRP, which includes under Standard And Guideline 49 (p. 4-91), "provide for the protection and habitat needs of sensitive plants so that Forest activities would not jeapardize the continued existence of such species.".

Alternative 2 (no action)

Under alternative 2, no work would be done on Deer Valley Meadow Restoration and Meadow Lake Road Maintenance, and the route would not be reopened to public motor vehicle use. Any potential impacts to any undetected Sensitive plant species that may occur in the proposed project area would be avoided without the proposed trail reconstruction. Since portions of the trail would no longer be open to public motor vehicle use there would a partial reduction in potential invasive species introduction due to exclusion of vehicle traffic. However, continued use of the trail by hikers and cyclists could continue to potentially vector invasive species along the trail. There would be some recovery of native vegetation along the trail corridor but since the trail will be still accessible to non-motorized recreationist it is likely to continue to have limited impacts on meadow vegetation and serve as a potential corridor for invasive species to establish and spread.

The contribution to cumulative effects from the Deer Valley Trail and Meadow Lake Road would result only from past activities. Because no direct impacts to Sensitive plants have been documented, but undiscovered occurrences may be present, the condition of Sensitive plant occurrences would remain stable or potentially improve.

Alternative 3 (Modified Seasonal Closure)
Effects to sensitive plant species are the same for Alternative 3 as the proposed action.
Alternative 4 (Extended Seasonal Closure)
Effects to sensitive plant species are the same for Alternative 4 as the proposed action.

VII. OTHER MANAGEMENT ISSUES AND RECOMMENDATIONS:

None.

VIII. MITIGATIONS AND MONITORING

Sensitive plants
Any new occurrences of sensitive plants identified within the project area would be flagged and avoided when necessary.

IX. DETERMINATION

For Listed Species
Alternative 1, 3, or 4 of the proposed Deer Valley Meadow Restoration and Meadow Lake Road Maintenance project will not affect *Packera layneae* or its habitat. Formal consultation with the U.S. Fish and Wildlife Service pursuant to Section 7 of the Endangered Species Act is not required.

For Candidate species
Alternative 1, 3, or 4 of the proposed Deer Valley Meadow Restoration and Meadow Lake Road Maintenance project would not affect *Pinus albicaulis*.

For Sensitive Species
There is no potential habitat for *Allium tribracteatum, Arctostaphylos nissenana, Balsamorhiza macrolepis* var. *macrolepis, Bruchia bolanderi, Calochortus clavatus* var. *avius, Cypripedium montanum, Draba asterophora* var. *asterophora, Draba asterophora* var. *macrocarpa, Eriogonum tripodum, Helodium blandowii, Horkelia parryi, Lewisia kelloggii ssp. hutchisonii, Lewisia kelloggii ssp. Kelloggii, Lewisia longipetala, Lewisia serrata, Meesia uliginosa, Navarretia prolifera ssp. lutea, Ophioglossum pusillum, Peltigera gowardii, Phacelia stebbinsii,* and *Poa sierra* in the project area. Therefore Alternative 1, 3, or 4 of the proposed Deer Valley Meadow Restoration and Meadow Lake Road Maintenance project would not affect these species.

Some suitable habitat for *Botrychium ascendens, Botrychium crenulatum, Botrychium lunaria, Botrychium minganense, Botrychium montanum, Botrychium paradoxum, Botrychium pedunculosum,* occurs in the Deer Valley Meadow Restoration and Meadow Lake Road Maintenance project area, but occurrences were not found during past or recent surveys. Because past surveys cannot positively state the absence of a sensitive plant species it is possible that the proposed project could affect undetected individuals in the project area. Therefore, Alternative 1, 3, or 4 of the proposed Deer Valley Meadow Restoration and Meadow Lake Road Maintenance project may affect undiscovered individuals but are not likely to result in a trend toward Federal listing or loss of viability for the 10 species listed above.

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APPENDIX A: BOTANY REPORT FOR SPECIAL INTEREST PLANTS

I. INTRODUCTION

Purpose: The purpose of the Botany Report is to describe effects on Special Interest (or watch list) plant species, special interest plant communities, and other botanical resources.

Special Interest Plant Species and communities:

There are no watch list species of concern in project area.

Meadows: The project proposes restoration within two meadows along the Deer Valley Trail and meadow complex bisected by Meadow Lake Road.

II. CURRENT MANAGEMENT DIRECTION

Special Interest species: A number of plant species do not meet all of the criteria to be included on the Regional Forester's Sensitive Plant List, but are of sufficient concern that we need to consider them in the planning process. These include species that are locally rare – as opposed to declining throughout their range – are of public concern, occur as disjunct populations, are newly described taxa, or lack sufficient information on population size, threats, trend or distribution.

Such species make an important contribution to forest biodiversity and are addressed as appropriate through the NEPA process. To better identify these species, forests have been encouraged to develop watch lists for these special interest species. These watch lists are dynamic and updated as the need arises to reflect changing conditions and new information.

Table X. watch list species for the Eldorado NF (updated 2015)

Species	Common Name	Habitat	Lower Elevation	Upper Elevation
Allium sanbornii var. congdonii	Congdon's onion	Serpentine outcrops, Sierra nevada foothills, Chaparral, Foothill Woodland	300m	1200m
Allium sanbornii var. sanbornii	Sanborn's onion	Cascade Range Foothills, n&c Sierra Nevada Foothills; southern Oregon. usually serpentinite, gravelly	260m	1530m
Astragalus austiniae	Austin's milk vetch, Austin's milkvetch	subalpine forest; Rocky Alpine boulder and rock field Subalpine coniferous forest	2320m	2690m
Astragalus whitneyi var. lenophyllus	wooly-leaved milk vetch; balloonpod milkvetch; Whitney's milk-vetch	Alpine boulder and rock field	1500m	3050m
Bolandra californica	Sierra bolandra	mesic, rocky. Rock crevices, wet cliffs.	975m	1270m
Botrychium simplex	little grapefern, Yosemite moonwort	Botrychium simplex is primarily a plant of open habitats, occurring in meadows, , fens, and in lake and stream edge	1560m	3590m
Calystegia vanzuukiae		Gabbro, serpentinite. Sierra Nevada foothills	500	1180m

Carex cyrtostachya	arching sedge	narrow endemic from the western slope of the northern Sierra Nevada of California	.	.
Carex davyi	Davy's sedge	Subalpine coniferous forest, Upper montane coniferous forest; Dry often sparse meadows, slopes	1400m	3300m
Ceanothus fresnensis	Fresno ceanothus, Fresno mat	Cismontane woodland (openings), lower montane coniferous forest	1120m	2080m
Chaenactis douglasii var. alpina	alpine dusty maindens	Alpine boulder and rock field (granitic), Rocky or gravelly ridges, talus, fell-fields, crevices	3000m	3400m
Chlorogalum grandiflorum	red hills soapwort	Serpentine outcrops, open shrubby or wooded hills; Chaparral, Foothill Woodland, Yellow Pine Forest	250m	960m
Clarkia biloba ssp. Brandegeeae	Brandegee's clarkia	Foothill woodland, northern Sierra Nevada. Often roadcuts, chaparral; cismontane woodland, lower montane coniferous forest.	75m	915m
Claytonia megarhiza	fell-fields claytonia; alpine spring beauty	Subalpine, alpine gravel, talus, crevices, n&c High Sierra Nevada, Warner Mountains; In crevices between rocks.	2600m	3532m
Corallorhiza trifida	northern coralroot; Early coralroot	mesic. Meadows and seeps (edges); Wet, open to shaded, generally conifer forest	1400m	1700m
Drosera anglica	English sundew	Bogs and fens, Meadows and seeps (mesic); Swamps, peatlands, often with Sphagnum	1300m	2000m
Drosera rotundifolia	round leaf sundew	Swamps, wet meadows, forests, peatlands, often with Sphagnum; Northwestern California (especially near coast), Cascade Range, High Sierra Nevada; to eastern United States, circumboreal	70m	2700m
Dryopteris filix-mas	male fern	Upper montane coniferous forest (granitic, rocky); Granitic cliffs	2400m	3100m
Myrica hartwegii	Sierra sweet bay	cismontane woodland, lower montaine coniferous forest, riparian woodland; Streambanks, moist places in foothills or low montane yellow-pine forest	150m	1800m
Perideridia bacigalupii	Bacigalupi's yampah; Bacigalupi's perideridia; Mother Lode Yampah	serpentinite. Chaparral; Lower montane coniferous forest; Chaparral, oak woodlands (e.g. those dominated by Quercus kelloggii, Q. lobata, Q. wislizeni, or Q. douglasii), and lower montane pine forests/woodlands.	450m	1035m

Piperia colemanii	Coleman's Rein Orchid	Open conifer forest, scrub; 1300–2000 m. High North Coast Ranges, High Cascade Range, Sierra Nevada; often sandy.	1200m	2300m
Piperia leptopetala	rein orchid, narrow petaled rein orchid	Generally dry sites, scrub, woodland; Chaparral, Foothill Woodland, Yellow Pine Forest, Red Fir Forest, Northern Coastal Scrub, Closed-cone Pine Forest	338m	2225m
Pseudostellaria sierrae	Sierra Starwort	Meadows, dry understory of mixed oak or conifer forest	1225m	2194m
Rhynchospora alba	white beaked-rush	Bogs and fens; Meadows and seeps; Marshes and swamps	60m	2040m
Rhynchospora capitellata	brownish beakrush; Northern Beaksedge	Wet meadows, fens, seeps, marshes	45m	2000m
Sambucus nigra L. ssp. Caerulea	Blue Elderberry	Riparian areas	0m	982m
Taxus brevifolia	California yew, Pacific yew, Western Yew	Mixed Evergreen Forest, Douglas-Fir Forest, Yellow Pine Forest, Red Fir Forest	50m	2810m
Torreya californica	California nutmeg, California torreya	Mixed Evergreen Forest, Douglas-Fir Forest, Yellow Pine Forest	15m	2090m
Viburnum ellipticum	oval-leaved viburnum	Chaparral, Cismontane woodland, Lower montane coniferous forest. Chaparral, yellow-pine forest, generally n-facing slopes	215m	1400m
Wyethia reticulata	El Dorado County mule ears	clay or gabbroic. Chaparral, Cismontane woodland, Lower montane coniferous forest, Wooded slopes, chaparral;	150m	630m

III. EXISTING ENVIRONMENT

Meadows: These unique plant communities often contain a high diversity of native species relative to surrounding forested areas and show wide variability between meadow types from dry upland meadows, to wet meadows and peatlands. While meadow types can vary greatly across the Eldorado NF, they generally share common characteristics including 1) the presence of plant communities dominated by herbaceous species 2) plants that use surface water and/or shallow groundwater and 3) woody vegetation may occur but is not dominant. These plant communities play and important role in providing wildlife habitat, regulating hydrologic processes, and proving both recreational and culturally functions. Potential threats include altering hydrologic processes that support meadow vegetation, invasive plant introduction, grazing, and some recreation activities.

IV. DESIGN CRITERIA

If new watch plant occurrences are discovered during project implementation the project botanist would be notified to develop necessary protection measures.

V. EFFECTS

Alternative 1, 3, and 4:

There are no known watch list plants within the project area were meadow restoration, road maintenance, or reroute activities would occur. Therefore direct and indirect effects from the proposed action are not expected. However, if past and recent surveys inadvertently overlook special interest plants, it is possible that some individuals may be affected directly by project activities. Indirect effects from project activity to undiscovered individuals may include soil compaction, crushing or uprooting individual plants, altered overstory conditions and potential introduction of non-native species and noxious weeds.

If any new special interest plant species are discovered in the project area, necessary actions would be considered to limit impacts from project activities. Therefore, the proposed project is not expected to cause cumulative effects for special interest plant species within the proposed project area.

Alternative 2

Under alternative 2, no work would be done on Deer Valley Trail and Meadow Lake Road, and the routes would not be reopened to public motor vehicle use. Any potential impacts to any undetected Watchlist plant species that may occur in the proposed project area would obviously be avoided without the proposed trail reconstruction. If the trail is no longer open to public motor vehicle use there would a partial reduction in potential invasive species introduction due to exclusion of vehicle traffic. However, continued use of the trail by hikers and cyclists could potentially vector invasive species along the trail. There would be some recovery of native vegetation along the trail corridor but since the trail will be still accessible to hikers and equestrians it is likely to continue to have limited impacts on meadow vegetation and serve as a potential corridor for invasive species to establish and spread.

The contribution to cumulative effects from the Deer Valley Trail restoration and Meadow Lake Road project would result only from past activities. Because no direct impacts to watchlist plants have been documented, but undiscovered occurrences may be present, the condition of watch list plant occurrences would remain stable or potentially improve. Minor improvements in habitat quality may occur within the project area but without the active restoration included in the proposed action meadow vegetation at the three project locations will likely continue to exhibit reduced vigor.

VI. MITIGATION

None required.

APPENDIX B: NOXIOUS WEED RISK ASSESSMENT

Five factors of weed spread were analyzed for the proposed Deer Valley Meadow Restoration and Meadow Lake Road Maintenance Project. Determinations of risk (High, Moderate, and Low) are summarized below along with the total risk of weed spread for the proposed project if suggested mitigation measures are implemented.

If the proposed project includes all listed mitigation measures to reduce or eliminate the risks of introducing or spreading noxious weeds in the project area then it is my determination that the risk of spreading noxious weeds in the project area is ***Low.***

Introduction: This assessment is in compliance with the Eldorado National Forest Land and Resource Management Plan (USFS ENF LRMP 1988), the Sierra Nevada Forest Plan Amendment (SNFPA) FSEIS and Record of Decision (ROD), Executive Order on Invasive Species (Executive Order 13112), and the direction in the Forest Service Manual section 2900, Noxious Weed Management (2012), which includes a policy statement calling for a risk assessment for noxious weeds to be completed for every project. The overriding principle stated in these documents is that the costs associated with preventing an infestation are much less than the costs of eliminating a population once it has expanded, and of dealing with the effects of a degraded plant community.

Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, or being nonnative or new to or not common to the United States or parts thereof (FSM 2900). In order to control noxious weeds the US Forest Service has adopted an integrated weed management approach to reduce the spread of noxious weeds on to, and from National Forest System lands. The main objective of this integrated approach to weed management is to prevent the introduction and establishment of noxious weed infestations, and control (contain and suppress) existing noxious weed infestations on National Forest System lands (FSM 2900). In addition when any ground disturbing action or activity is proposed, the federal agency is required to determine the risk of introducing or spreading noxious weeds associated with the proposed action (FSM 2900).

1. Noxious Weeds Present In or Near Project Area (Moderate)
Existing noxious weed records and FS plants lists were reviewed for the Deer Valley and Meadow Lake Road maintenance project area (ENF 2014 weed layer). Major sections of the trail were also surveyed in 2014. The only known non-native plant species within the project area are Sheep Sorrel (*Rumex acetosella)* dandelion (*Taraxacum officinale*) both of which were found in Deer Valley.

2. Habitat Vulnerability (Moderate)
The Deer Valley Trail and Meadow Lake Road both travel through primarily intact native plant communities found in upper montane forests, riparian and meadow plant communities. The vegetation along the trail is relatively intact and therefore considered resilient to invasion to many invasive species of concern for the Eldorado National Forest. However, the corridor along trail is by nature highly disturbed and susceptible to invasion by weedy species that readily colonize bare ground created along the trail.

3. Non-project Weed Vectors (Moderate)
The primary non-project weed vector for the project include the OHV recreationists that visit Deer Valley 4wd trail and general public and PG&E staff using Meadow Lake Road. The

associated vehicles and equipment primarily travel from the Central Valley and across California and could easily spread new infestations into the project area if equipment and vehicles last operated in areas infested with invasive plant species and were not properly cleaned prior to arriving to the Blue Lakes area.

4. Habitat Alteration Expected as Result of Projects (Moderate)
Overall habitat alteration is expected to be localized in the context of the entire Deer Valley 4wd Trail and Meadow Lake road and involves ground disturbance activities within limited areas along existing travel corridors. Habitat alteration in the vicinity of Meadow lake road will primarily be restricted to the existing road corridor. The proposed reroute at meadow 9N83-2 will create 500 feet of new trail. While this new segment of trail will become more susceptible to future invasion, the old trail through the meadow will be revegetated and therefore less susceptible to invasion following project completion.

5. Increased Vectors as a Result of Project Implementation (Moderate)
The proposed project would *temporarily* increase potential weed vectors due to the increase in project related vehicle and equipment use. Potential introduction of invasive species may occur when equipment is first brought into the project area or if equipment travels or is used within existing infestations in the project area.

Another potential vector for invasive species related to project activities is the importation of materials such as fill, gravel, and rock during trail reconstruction. Erosion control material such as straw and seeds can also introduce new noxious weeds into the project area.

Management requirements have been incorporated into the project to reduce or eliminate the likelihood of most vector opportunities related to the proposed project (see section 6).

6. Mitigation Measures
The following mitigation measures should be included in the Deer Valley 4wd trail meadow restoration and Blue Lakes Road project. These mitigation measures have been designed to limit the potential introduction of new noxious weeds into the project area and limit the potential spread of existing priority invasive plant infestations.

- All off-road equipment would be cleaned to insure it is free of soil, seeds, vegetative matter or other debris that could contain seeds before entering the project area.
- Any straw or mulch used for erosion control would be certified weed-free. A certificate from the county of origin stating the material was inspected is required.
- Any revegetation material used for restoration or erosion control would be from a locally collected source.
- Infestations of noxious weeds that are discovered during project implementation would be documented and locations mapped. New sites would be reported to the Forest botanist.
- All gravel, fill, rock or other material would be weed free. Onsite sand, gravel, or rock would be used where possible.
- Known sites will be flagged prior to work and avoided during implementation. There is to be no vehicle travel, vehicle or material staging, rock collection, or tree felling within the flagged areas.

7. Anticipated weed response to proposed action (Low Risk)
The proposed meadow restoration and road maintenance are relatively limited in scope and are not expected to drastically alter native vegetation in the project area. Additionally, much of the native vegetation along the trail is robust, free of invasive species, and resilient to large scale invasion (excluding the actual trail tread and disturbance corridor). Outside of the proposed trail reconstruction activities, there is some risk for invasive species introduction (4wd vehicles, hikers, cyclists) which is expected to persist in the project area once proposed activities are completed. For the meadow restoration and road maintenance project, insuring the equipment and materials brought into the project area are weed-free and planting native vegetation as a part of restoration activities are critical for reducing the risk of invasive species establishing in the project area. While these measures are largely effective they cannot guarantee that invasive species are not inadvertently introduced during project activities so post construction monitoring should also be conducted to insure design features were effective. Based on the above assessment, without the proposed mitigation it is my determination that the proposed Deer Valley Meadow Restoration and Meadow Lake Road Maintenance project would pose a *moderate* risk of spreading invasive plant species. If all mitigation measures are included then the expected risk of invasive species introduction and spread would be reduced to a *low* risk.

APPENDIX C: NOXIOUS/INVASIVE WEEDS OF CONCERN

Group 1 (Eradicate): Highly invasive species known to occur on the Eldorado National Forest. Species are uncommon and are a priority for control and eradication.

Acroptilon repens Russian knapweed
Aegilops triuncialis barbed goatgrass
Ailanthus altissima Chinese tree of heaven
Arundo donax Arundo
Centaurea calcitrapa purple starthistle
Centaurea diffusa diffuse (white) knapweed
Centaurea stoebe spotted knapweed
Cirsium arvense Canada thistle
Euphorbia oblongata oblong spurge
Lepidium latifolium tall whitetop
Lythrum salicaria purple loosestrife

Group 2 and 3 (Control): Established or widespread species known to occur on the Eldorado National Forest. Management strategies should consider eradicating isolated populations and controlling established infestation.

Brassica nigra black mustard
Bromus tectorum cheat grass
Carduus pycnocephalus Italian thistle
Centaurea melitensis tocalote
Centaurea solstitialis yellow starthistle
Chenopodium botrys Jerusalem-oak goosefoot
Chondrilla juncea rush skeleton weed
Cirsium vulgare bull thistle
Cytisus scoparius Scotch broom
Foeniculum vulgare Fennel
Genista monspessulana French broom
Hedera helix English Ivy
Hypericum perforatum Klamath weed
Lathyrus latifolius perennial sweet pea
Leucanthemum vulgare Oxeye daisy
Melilotus alba white sweet clover
Melilotus officinalis yellow sweet clover
Potentilla recta Sulfur cinquefoil
Rubus armeniacus Himalayan blackberry
Salsola tragus Russian thistle/tumbleweed
Silybum marianum milk thistle
Spartium junceum Spanish broom
Elymus caput-medusae medusahead
Vinca major periwinkle

Potential invasives: Species not yet found on the Eldorado National Forest. If found infestations should be targeted for eradication or control.

Aegilops cylindrica Jointed goatgrass
Cardaria chalepensis small whitetop
Cardaria draba hoarycress
Cardaria pubescens whitetop
Carduus nutans musk thistle
Carthamus lanatus Woolly distaff thistle
Centaurea pratensis meadow knapweed
Centaurea sulphurea Sicilian starthistle
Dittrichia graveolens stinkwort
Euphorbia esula leafy spurge
Isatis tinctoria dyer's woad
Linaria genistifolia ssp. *dalmatica* dalmatian toadflax
Linaria vulgaris yellow toadflax
Nicotiana glauca Tree tobacco
Onopordum acanthium Scotch thistle
Phragmites australis common reed
Polygonum cuspidatum Japanese knotweed
Polygonum sachalinense Sakhalin knotweed
Potentilla recta Sulfur cinquefoil
Sesbania punicea Scarlet wisteria
Tamarix chinensis Salt Cedar
Tanacetum vulgare tansy
Ulex europaeus Gorse

Priority 4 (manage through education and prevention): Species are well established across forest or have minor economic or ecological impacts. Forest will use appropriate prevention and education measures to limit further spread.

Bromus diandrus ripgut brome
Bromus madritensis var rubens red brome
Cortaderia selloana pampas grass
Conium maculatum poison hemlock
Cynodon dactylon Bermuda grass
Cynosurus echinatus spiny dogtail
Dactylis glomerata Orchard grass
Festuca arundinacea tall fescue
Hirschfeldia incana mustard
Lychnis coronaria rose campion/ mullein pink
Sisymbrium altissimum Jim Hill mustard
Torilis nodosa hedge parsley
Tribulus terrestris puncture vine
Verbascum thapsus mullein